Prime Triplet Conjecture

Toshiro Takami*
mmm82889@yahoo.co.jp

Abstract

Prime Triplet and Twin Primes have exactly the same dynamics.

All Prime Triplet are executed in hexagonal circulation. It does not change in a huge number (forever huge number).
In the hexagon, Prime Triplet are generated only at (6n -1)(6n+1). [n is a positive integer]

When the number grows to the limit, the denominator of the expression becomes very large, and primes occur very rarely, but since Prime Triplet are 35/12 times of the 3th power distribution of primes, the frequency of occurrence of Prime Triplet is very equal to 0.

However, it is not 0. Therefore, Prime Triplet continue to be generated.

If Prime Triplet is finite, the Primes is finite.
The probability of Prime Triplet 35/12 times of the 3th power probability of appearance of the Prime. This is contradictory. Because there are an infinite of Primes.

and
(probability of the occurrence of the Primes)=
$(probability\ of\ the\ occurrence\ of\ the\ Prime\ Triplet)^{-3} \times\ (12/35)$

That is, Prime Triplet exist forever.

key words
Hexagonal circulation, Prime Triplet,
35/12 times of the 3th power probability of the Primes

Introduction

*47-8 kuyamadai, Isahaya-shi, Nagasaki-prefecture, 854-0067 Japan

Prime Triplet is represented as (6n -1) or (6n+1). And, n is positive integer.

All Prime Triplet are combination of (6n -1) and (6n+1).
That is, all Prime Triplet are a combination of 5th-angle and 1th-angle.

3th-angle is (6n -1).
1th-angle is (6n+1).

(6n -2), (6n), (6n+2) are even numbers.

(6n -1), (6n+1), (6n+3) are odd numbers.

The Prime Triplet are (6n -1) and (6n+1).
There are no prime numbers that are not (6n -1) or (6n+1).
The following is a Prime Triplet.
5 ——— 6n -1
7 ——— 6n+1
11 ——— 6n -1
....
....
(5, 7, 11), (7, 11, 13), (11, 13, 17), (13, 17, 19), (17, 19, 23), (37, 41, 43), (41, 43, 47), (67, 71, 73), (97, 101, 103)....

and
(p, p+2, p+6) type
5, 11, 17, 41, 101, 107, 191, 227, 311, 347, 461, 641, 821, 857, 881, 1091, 1277, 1301, 1427, 1481, 1487, 1607, 1871, 1997, 2081, 2237, 2267, 2657, 2687, 3251, 3461, 3527, 3671, 3917, 4001, 4127, 4517, 4637, 4787, 4931, 4967, 5231, 5477....
sum is 43.

and
(p, p+4, p+6) type
7, 13, 37, 67, 97, 103, 193, 223, 277, 307, 457, 613, 823, 853, 877, 1087, 1297, 1423, 1447, 1483, 1663, 1693, 1783, 1867, 1873, 1993, 2083, 2137, 2377, 2683, 2707, 2797, 3163, 3253, 3457, 3463, 3847, 4153, 4513, 4783, 5227, 5413, 5437....
sum is 43.

In (p, p+2, p+6) type
There are 783 Primes from 1 to 6×10^3=6000.
Probability is $\frac{783}{1000}$.

In this, there are 43 Prime Triplet. Probability is $\frac{43}{6000}$=0.0071666...
and $[\frac{783}{6000}]^3 \times \frac{35}{12}$=0.00648213890625

In (p, p+4, p+6) type
There are 783 Primes frpm 1 to 1×10^3=1000.
Probability is $\frac{783}{1000}$.
In this, there are 43 Prime Triplet. Probability is $\frac{43}{6000}$=0.0071666...
and $[\frac{783}{6000}]^3 \times \frac{35}{12}$=0.00648213890625

In (p, p+4, p+6) type
There are 783 Primes from 1 to 1×10^3=1000.
Probability is $\frac{783}{1000}$.
In this, there are 43 Prime Triplet. Probability is $\frac{43}{6000}$=0.0071666...
and $[\frac{783}{6000}]^3 \times \frac{35}{12}$=0.00648213890625

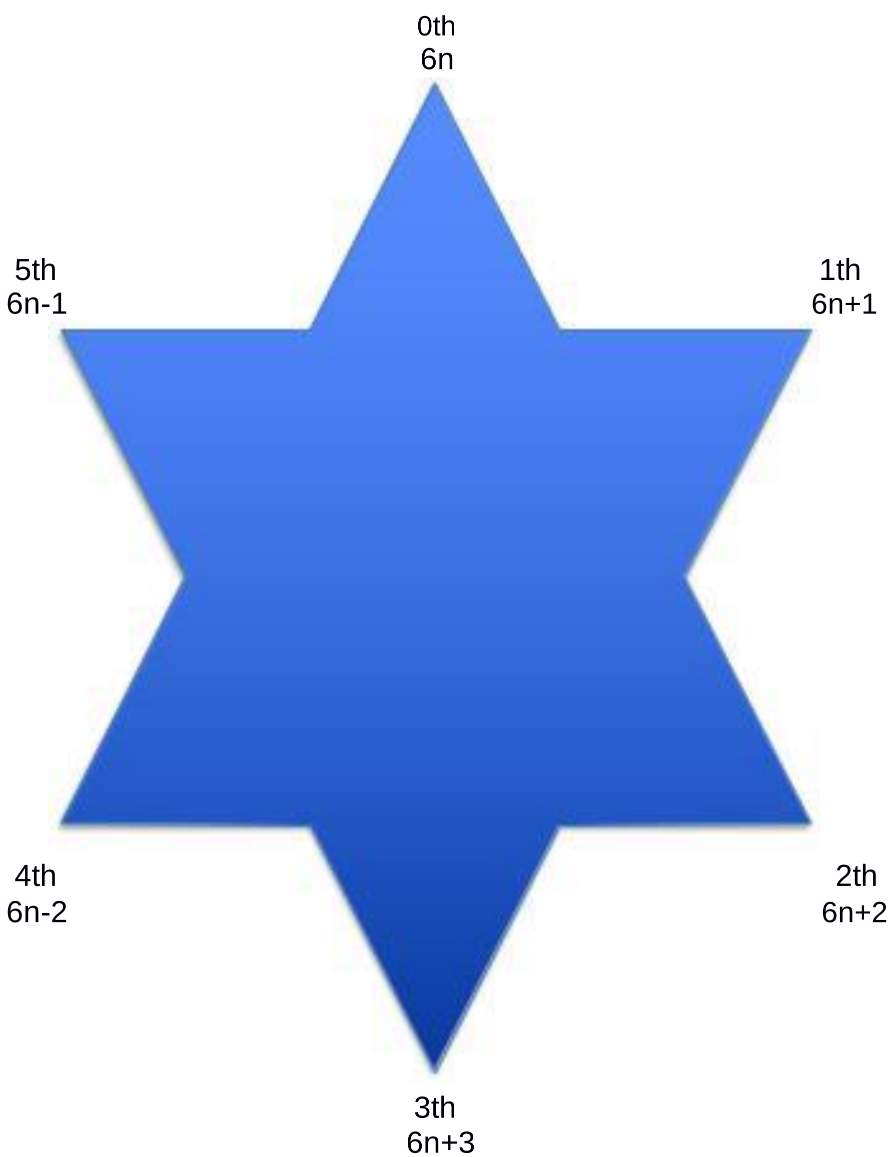
If we do not distinguish (p, p+2, p+6) type from (p, p+4, p+6) type[7]
There are 82134 Primes from 1 to 1050000.
Probability is $\frac{82134}{1050000}$.
In this, there are 2958 Prime Triplet. Probability is $\frac{2958}{1050000}$=0.002817142857...
and $[\frac{82134}{1050000}]^3 \times \frac{35}{12} \times 2$=0.0027920154577...

If the number of triplets less than 10^8 is 55,600 and 55,556 respectively[6].

In (p, p+2, p+6) type
There are 5761455 Primes from 1 to 1×10^8.
Probability is $\frac{5761455}{100000000}$.
In this, there are 55600 Prime Triplet. Probability is $\frac{55600}{10000000}$=0.000556
and $[\frac{5761455}{100000000}]^3 \times \frac{35}{12}$=0.00055780617902704412484375

In (p, p+4, p+6) type
There are 5761455 Primes from 1 to 1×10^8.
Probability is $\frac{5761455}{100000000}$.
In this, there are 55556 Prime Triplet. Probability is $\frac{55556}{100000000}$=0.00055556
and $[\frac{5761455}{100000000}]^3 \times \frac{35}{12}$=0.00055780617902704412484375

The meaning of the constant 35/12 is currently under consideration.


0th
6n
5th
6n-1
1th
6n+1
4th
6n-2
2th
6n+2
3th
6n+3

Discussion

Although not found in the literature, Prime Triplet and twin primes have exactly the same dynamics.
This means that if twin primes are infinite, Prime Triplet are infinite.

The probability that Prime Triplet will occur 35/12 times of the 3th power of the probability that a Prime will occur in a huge number, where the probability that a prime will occur is low from the equation (1).
While a Primes is generated, Prime Triplet be generated.

And, as can be seen from the equation below, even if the number becomes large, the degree of occurrence of Primes only decreases little by little.

$$\pi(x) \sim \frac{x}{\log x} \quad (x \to \infty) \tag{1}$$

$\log(10^{20}) = 20\log(10) \approx 46.0517018$
$\log(10^{200}) = 200\log(10) \approx 460.517018$
$\log(10^{2000}) = 2000\log(10) \approx 4605.17018$
$\log(10^{20000}) = 20000\ \log(10) \approx 46051.7018$
$\log(10^{200000}) = 200000\ \log(10)\ \approx 460517.018$
$\log(10^{2000000}) = 2000000\ \log(10)\ \approx 4605170.18$

(Expected to be larger than $\log(10^{200000})$)

As x in $\log(x)$ grows to the limit, the denominator of the equation also grows extremely large. Even if primes are generated, the frequency of occurrence is extremely low. The generation of Prime Triplet is 35/12 times of the 3th power of the generation frequency of primes, and the generation frequency is extremely low.

However, as long as Primes are generated, Prime Triplet are generated with a very low frequency.

When the number grows to the limit, the denominator of the expression becomes very large, and primes occur very rarely, but since Prime Triplet are 35/12 times of the 3th power of the distribution of Primes, the frequency of occurrence of Prime Triplet is very equal to 0.

However, it is not 0. Therefore, Prime Sextuplet continue to be generated.

However, when the number grows to the limit, the probability of the Prime Triplet appearing is almost 0 because it is 35/12 times of the 3th power of probability of the appearance of the Prime.
It is a subtle place to say that almost 0 appears.

Use a contradiction method.
If Prime Triplet is finite, the Primes is finite.
The probability of Prime Triplet 35/12 times of the 3th power of the probability of the appearance of the Prime.
This is contradictory. Because there are an infinite of Primes.

and
(probability of the occurrence of the Primes)=
$(probability\ of\ the\ occurrence\ of\ the\ Prime\ Triplet)^{-3} \times\ (12/35)$

That is, Prime Triplet exist forever.

Proof end.

References

[1] John Derbyshire.: Prime Obsession: Bernhard Riemann and The Greatest Unsolved Problem in Mathematics, Joseph Henry Press, 2003

[2] Marcus du Sautoy.: The Music of The Primes, Zahar Press, 2007

[3] Joseph Hirsch.: PRIME TRIPLETS, National Council of Teachers of Mathematics, 1969 http://primes.utm.edu/

[4] https://prime-numbers.info/list/prime-triplets

[5] T.Takami.: Twin Prime Conjecture, viXra:1910.0081